

What is claimed is:

1. A process for acid-catalyzed hydrolysis of a carboxylic ester to the corresponding carboxylic acid and the
5 corresponding alcohol in the presence of water by passing an inlet stream comprising the carboxylic ester mixed with water into a first prereactor having a hydrolysis catalyst, which hydrolyzes the carboxylic ester at least partly to the hydrolysis products, removing the reaction mixture from
10 this first prereactor and passing it at least partly into a reactive distillation column comprising a hydrolysis catalyst, which converts the carboxylic ester stream comprising water further to carboxylic acid and alcohol and simultaneously at least partly separates it into the
15 components, the mixtures comprising the less volatile compounds and the low-boiling carboxylic ester being removed at least partly as a distillate from the upper rectification zone of the reactive distillation column and the accompanying condensation system of the reactive
20 distillation column and the less volatile compounds collecting at least partly as a bottom fraction which is passed into a further distillation column, characterized in that the aqueous carboxylic acid is fed from the bottom fraction or from the lower rectification zone on the
25 distillation column, mixed with further carboxylic ester, to a second prereactor comprising a hydrolysis catalyst, the reaction mixture is removed from the second prereactor and passed at least partly into the reactive distillation column.
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2. The process of claim 1, characterized in that the aqueous carboxylic acid from the bottom fraction or from the lower rectification zone of the distillation column is mixed with
35 a separately fed carboxylic ester stream or carboxylic ester-containing stream and subsequently fed to the second prereactor.

3. The process of at least one of claims 1 and 2,
characterized in that the distillate of the reactive
distillation column comprising carboxylic ester which is
yet to be converted is fed at least partly back to the
first prereactor.
4. The process of at least one of claims 1 to 3, characterized
in that the aqueous carboxylic acid from the bottom
fraction or from the lower rectification zone of the
distillation column is mixed with the distillate of the
reactive distillation column comprising carboxylic ester
which is yet to be converted and subsequently fed to the
second prereactor.
5. The process of at least one of claims 1 to 4, characterized
in that the aqueous, hot carboxylic acid stream from the
bottom fraction or from the lower rectification zone of the
distillation column is utilized for heating the stream
comprising carboxylic ester to be mixed with it.
6. The process of at least one of claims 1 to 5, characterized
in that the reaction product from the second prereactor is
fed in below the reaction zone and above the lower
rectification zone or in the upper third of the lower
rectification zone of the reactive distillation column.
7. The process of at least one of claims 1 to 6, characterized
in that the carboxylic ester is selected from the group
consisting of methyl and ethyl formate, methyl, ethyl,
propyl, isobutyl and tert-butyl acetate, methyl and ethyl
propionate and methyl, ethyl and propyl butyrate.
8. The process of at least one of claims 1 to 7, characterized
in that the inlet stream to the first prereactor comprises
the azeotrope of the carboxylic ester with the
corresponding alcohol.

9. The process of at least one of claims 1 to 8, characterized in that the low boilers are at least partly removed from the distillate of the reactive distillation column.

10. The process as claimed in one or more of claims 1 to 9, characterized in that it is operated continuously.

11. An apparatus for acid-catalyzed hydrolysis of a carboxylic ester to the corresponding carboxylic acid and the corresponding alcohol in the presence of water by a process as claimed in at least one of claims 1 to 10, comprising

a) a first prereactor **1** comprising a hydrolysis catalyst and having at least one inlet line **2** for feeding in a fluid stream comprising the carboxylic ester, line **2'**, and water, line **2''**, and also at least one outlet **4** for removing the reaction mixture,

b) at least one heating apparatus for heating the inlet stream, line **2**, of the first prereactor **1**, or both,

c) a second prereactor **19** comprising a hydrolysis catalyst and having at least one inlet for a fluid stream comprising at least partly the aqueous carboxylic acid from the bottom fraction or a fraction of the lower rectification zone **14** of the distillation column **13**, line **18**, also mixed with a carboxylic ester stream, line **20**, and at least one outlet, line **25**,

d) a reactive distillation column **7** comprising a catalyst zone **8** having a hydrolysis catalyst and having an inlet **6** connected to the first prereactor **1**, an inlet connected to the second prereactor, line **25**, the catalyst zone **8** being disposed between a lower rectification zone **9** and an upper rectification zone **10**,

e) line **22** attached at the distillation head of the reactive distillation column for removing the top fraction or as a purge,

f) line **21** connected to the line **22** conducting the top fraction of the reactive distillation column **7** or to the upper rectification zone **10** or the condensation system of

the reactive distillation column 7, for removing distillate,

- g) line 11 attached at the distillation bottom of the reactive distillation column 7, for removing the bottom fraction,
 - 5 h) a distillation column 13, the line 11 forming the inlet for removing the bottom fraction of the reactive distillation column 7, at whose distillation bottom, line 26, aqueous carboxylic acid is removed,
 - 10 i) line 18 conducting a fraction of aqueous carboxylic acid withdrawn from the lower rectification zone 14 of the distillation column 13 or a portion of line 26, this forming the inlet to the second prereactor 19, mixed with the carboxylic ester, line 20.
- 15 12. The apparatus of claim 11, characterized in that the line 18 for removing the aqueous carboxylic acid from the distillation column 13 is connected to a line 20 conducting a further carboxylic ester stream upstream of entry into the second prereactor 19.
- 20 13. The apparatus of at least one of claims 11 and 12, characterized in that the line 21 conducting the carboxylic ester which is yet to be converted from the reactive distillation column 7 is connected to the inlet line 2 or
- 25 one of the two process feeds, lines 2' and 2'', of the first prereactor 1, which supply it with carboxylic ester and water.
- 30 14. The apparatus of claim 13, characterized in that the line 21 withdraws unconverted carboxylic ester from the lower half of the upper rectification column 10 of the reactive distillation column 7.
- 35 15. The apparatus of at least one of claims 11 to 14, characterized in that the line 18 conducting the aqueous carboxylic ester stream is connected upstream of entry into the second prereactor 19 to the line 21 which conducts at least part of the top fraction or a fraction from the upper

rectification zone **10** or the accompanying condensation system of the reactive distillation column **7**.

16. The apparatus of at least one of claims 11 to 15,
5 characterized in that the reactive distillation column **7** has an inlet **6** for the feed stream from the first prereactor **1** in the upper third of the catalyst zone **8** or above the catalyst zone **8** and below the upper rectification zone **10**.

10 17. The apparatus of at least one of claims 11 to 16, characterized in that the reactive distillation column **7** has an inlet **6** for the feed stream from the first prereactor **1** below the catalyst zone **8** and above the lower
15 rectification zone **9** or in the upper third of the lower rectification zone **10**.

18. The apparatus of at least one of claims 11 to 17,
20 characterized in that the reactive distillation column **7** has an inlet for the line **25** from the second prereactor **19** below the catalyst zone **8** and above the lower rectification zone **9** or in the upper third of the lower rectification zone **9**.

25 19. The apparatus of at least one of claims 11 to 18, characterized in that the hydrolysis catalysts in the first prereactor **1** or second prereactor **19** are each independently beds of a fixed catalyst, fixed in structured catalyst
30 packings or installed in stirrers or are fluidized.

20. The apparatus of at least one of claims 11 to 19,
35 characterized in that the hydrolysis catalyst in the reactive distillation column **7** is a bed of a solid catalyst, fixed in structured catalyst packing or arranged on the trays and also in the downcomers of a tray column.